

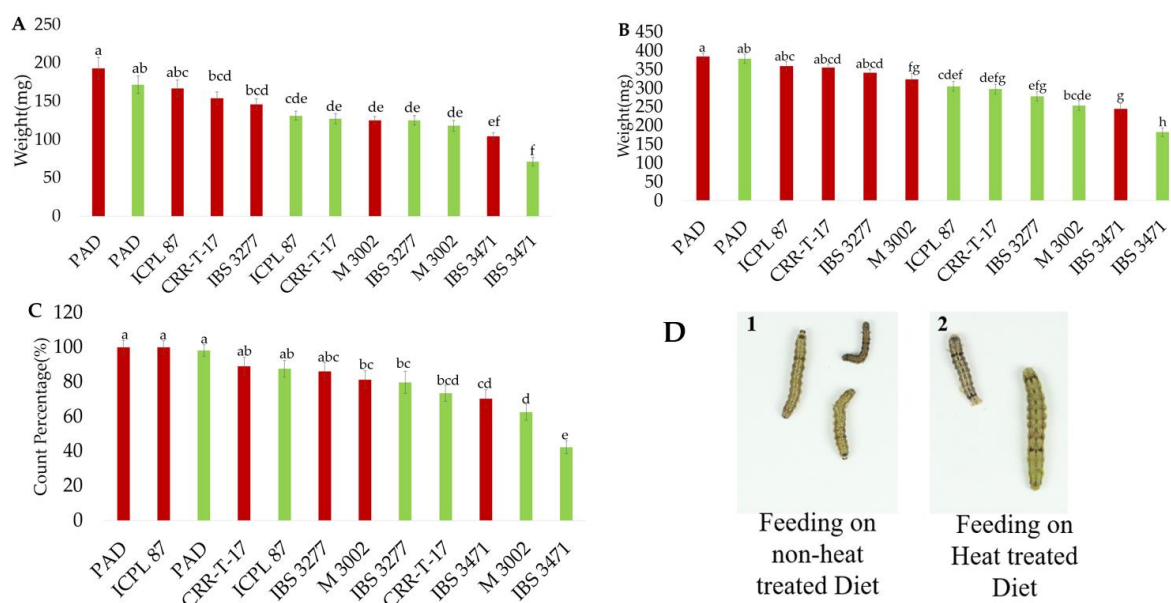
**Supplementary Materials:** The following are available online at <https://zenodo.org/badge/DOI/10.5281/zenodo.3667027.svg>, Table S1. Preliminary screening for insect-resistance using a non-heat-treated artificial diet supplemented with lyophilised leaf powder from 11 accessions of *C. scarabaeoides* and *C. cajan* received from Australian Grains Genebank, Figure S1. Average larval weight of *H. armigera* fed on different accessions of *C. scarabaeoides* and *C. cajan* using non-heated (green bars) and heated (red bars) artificial diet supplemented with lyophilised leaf powder, Table S2. Nutritional composition of raw mature seeds, Table S3. Summary of protein abundance for cysteine proteinase inhibitor and Lectin-domain containing receptor kinase A4.2 in *Cajanus cajan* (ICPL 87) and *Cajanus scarabaeoides* (IBS 3471) leaves.

**Supplementary Table S1.** Preliminary screening for insect-resistance using a non-heat-treated artificial diet supplemented with lyophilised leaf powder from 11 accessions of *C. scarabaeoides* and *C. cajan* received from Australian Grains Genebank. The mean larval weight (mg) is an average of 75 replication. Values with similar letters do not differ significantly at  $P < 0.05$  (Tukey's HSD test).

| Genotype ID           | Average weight (mg) | Country of origin | Scientific name              |
|-----------------------|---------------------|-------------------|------------------------------|
| ICPL 87 <sup>1</sup>  | 472.4 <sup>A</sup>  | ICRISAT/India     | <i>Cajanus cajan</i>         |
| IBS 2653              | 440.6 <sup>AB</sup> | Australia         | <i>Cajanus scarabaeoides</i> |
| IBS 3481              | 436.5 <sup>AB</sup> | India             | <i>Cajanus scarabaeoides</i> |
| IBS 3108              | 435.7 <sup>AB</sup> | India             | <i>Cajanus scarabaeoides</i> |
| IBS 3422              | 417.6 <sup>AB</sup> | India             | <i>Cajanus scarabaeoides</i> |
| IBS 3338              | 414.5 <sup>AB</sup> | India             | <i>Cajanus scarabaeoides</i> |
| IBS 3155              | 413.8 <sup>AB</sup> | India             | <i>Cajanus scarabaeoides</i> |
| IBS 2984              | 413.8 <sup>AB</sup> | Australia         | <i>Cajanus scarabaeoides</i> |
| CRR-T-17 <sup>2</sup> | 412.3 <sup>B</sup>  | Indonesia         | <i>Cajanus scarabaeoides</i> |
| IBS 3277 <sup>2</sup> | 399.1 <sup>B</sup>  | India             | <i>Cajanus scarabaeoides</i> |
| M3002 <sup>2</sup>    | 384.7 <sup>B</sup>  | India             | <i>Cajanus scarabaeoides</i> |
| IBS 3471 <sup>2</sup> | 322.05 <sup>C</sup> | India             | <i>Cajanus scarabaeoides</i> |

<sup>1</sup>: susceptible to *H. armigera*

<sup>2</sup>: Top 4 accessions with moderate to high level of resistance to *H. armigera* (based on this preliminary study)



**Supplementary Figure S1.** Average larval weight of *H. armigera* fed on different accessions of *C. scarabaeoides* and *C. cajan* using non-heated (green bars) and heated (red bars) artificial diet supplemented with lyophilised leaf powder. A and B) Larval weight (mg) on day three and five respectively, C) Percentage of pupa formed by Day 11, D) Representative larvae fed on non-heat-treated artificial diet (D1) and larvae fed on heat-treated artificial diet (D2), both pictures were taken on day five. \* Indicates significantly different at  $P < 0.05$  (Tukey's HSD test) to ICPL 87 and PAD heat and non-heat diets. All data are means  $\pm$  standard errors ( $n = 64$ ).

**Supplementary Table S2.** Mineral and protein composition of raw mature pigeonpea seeds. Nutrient values are per 100 g of the used portion of the dried weight and all values reported were averages of three determinations. The mineral analysis was determined using Inductively Coupled Plasma Optical Emission Spectrometry (ICP-EOS) as per Wheal and Palmer [55], protocol. The approximate protein content was calculated by using the estimated nitrogen value obtained by Dumas method using a TruMac<sup>®</sup> Series CNS Analyser (LECO<sup>®</sup> Corporation, USA) protein analyser as per Skylas et al. [56] protocol and multiplying it with the standard nitrogen-to-protein conversion factor of 6.25 (Jones' factors). Values with similar letters do not differ significantly at  $P < 0.05$  (Tukey's HSD test).

| Genotype ID         | Ca                  | S                    | Mg                  | K                    | Na                | P                   | Zn                | B                 | Cu                | Fe                   | Mn                | Average Protein content |
|---------------------|---------------------|----------------------|---------------------|----------------------|-------------------|---------------------|-------------------|-------------------|-------------------|----------------------|-------------------|-------------------------|
| ICPL 87             | 102.06 <sup>E</sup> | 169.06 <sup>D</sup>  | 99.96 <sup>E</sup>  | 1474.40 <sup>A</sup> | 1.88 <sup>C</sup> | 375.80 <sup>A</sup> | 3.60 <sup>A</sup> | 1.85 <sup>B</sup> | 0.51 <sup>A</sup> | 3.94 <sup>C</sup>    | 1.98 <sup>D</sup> | 25.53 <sup>A</sup>      |
| CRR-T-17            | 329.29 <sup>C</sup> | 213.36 <sup>B</sup>  | 149.95 <sup>A</sup> | 1308.14 <sup>C</sup> | 1.78 <sup>C</sup> | 324.73 <sup>C</sup> | 3.23 <sup>C</sup> | 1.91 <sup>B</sup> | 1.13 <sup>A</sup> | 4.38 <sup>A</sup>    | 3.79 <sup>B</sup> | 22.46 <sup>A</sup>      |
| M3002               | 426.90 <sup>B</sup> | 216.01 <sup>B</sup>  | 119.73 <sup>B</sup> | 1281.91 <sup>D</sup> | 2.47 <sup>B</sup> | 297.35 <sup>D</sup> | 3.56 <sup>A</sup> | 2.16 <sup>A</sup> | 0.61 <sup>A</sup> | 4.18 <sup>B</sup>    | 5.18 <sup>A</sup> | 23.19 <sup>A</sup>      |
| IBS 3277            | 312.60 <sup>D</sup> | 206.72 <sup>C</sup>  | 106.81 <sup>D</sup> | 1444.26 <sup>B</sup> | 1.56 <sup>D</sup> | 349.02 <sup>B</sup> | 3.40 <sup>B</sup> | 2.20 <sup>A</sup> | 0.70 <sup>A</sup> | 4.20 <sup>A, B</sup> | 3.51 <sup>C</sup> | 23.68 <sup>A</sup>      |
| IBS 3471            | 450.48 <sup>A</sup> | 236.029 <sup>A</sup> | 113.90 <sup>C</sup> | 1438.25 <sup>B</sup> | 3.57 <sup>A</sup> | 312.64 <sup>C</sup> | 3.12 <sup>C</sup> | 1.76 <sup>B</sup> | 0.73 <sup>A</sup> | 3.41 <sup>D</sup>    | 3.73 <sup>B</sup> | 24.15 <sup>A</sup>      |
| USDA [57]           | 130                 |                      | 183                 | 1392                 | 17                |                     | 2.76              |                   | 1.06              | 5.23                 | 1.79              |                         |
| Oshodi et al. [58]  | 81.4                |                      | 110                 | 1308                 | 9.9               |                     | 4.1               |                   | 1.3               | 13.7                 | 1.3               |                         |
| Holland et al. [59] | 140                 |                      | 100                 | 1390                 | 38                |                     | 2.5               |                   | 1.2               | 3.4                  | 1.1               |                         |
| Saxena et al. [60]  | 120.8               |                      | 122                 |                      |                   |                     | 2.3               |                   | 1.3               | 3.9                  |                   |                         |

**Supplementary Table S3.** Summary of protein abundance for cysteine proteinase inhibitor and Lectin-domain containing receptor kinase A4.2 in *Cajanus cajan* (ICPL 87) and *Cajanus scarabaeoides* (IBS 3471) leaves.

| Uniport ID  |             | A0A151QZF6                    | A0A151QZM0                                    |                                  |                             |
|-------------|-------------|-------------------------------|---|----------------------------------|-----------------------------|
| Genotype ID | Replication | Cysteine proteinase inhibitor | Lectin-domain containing receptor kinase A4.2 | TMT reagent labelling of peptide | Growth stage                |
| ICPL 87     | Rep 1       | 612.65                        | 38.359  | 129N                             | Vegetative stage            |
| ICPL 87     | Rep 2       | 623.909                       | 49.48   | 129C                             |                             |
| ICPL 87     | Rep 1       | 726                           | 40.3  | 130N                             | Flowering and Podding stage |
| ICPL 87     | Rep 2       | 622.974                       | 43.089  | 130C                             |                             |
| ICPL 87     | Rep 3       | 540.35                        | 42.254  | 131                              |                             |
| IBS 3471    | Rep 1       | 3524.086                      | 159.846                                       | 126                              | Vegetative stage            |
| IBS 3471    | Rep 2       | 2790.445                      | 172.671                                       | 127N                             |                             |
| IBS 3471    | Rep 1       | 2174.961                      | 124.48  | 127C                             | Flowering and Podding stage |
| IBS 3471    | Rep 2       | 1300.956                      | 140.613                                       | 128N                             |                             |
| IBS 3471    | Rep 3       | 1148.025                      | 162.613                                       | 128C                             |                             |